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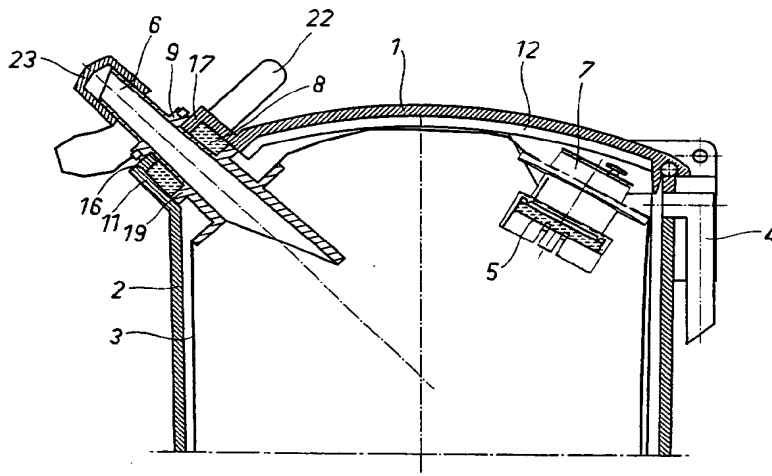
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- (71) Applicant (for all designated States except US): **OY NIKOMED FINLAND AB** [FI/FI]; Olarinluoma 16, FIN-02200 Espoo (FI).
- (72) Inventors; and
- (75) Inventors/Applicants (for US only): **OIKARINEN, Juhani** [FI/FI]; Merivirta 15 C 34, FIN-02320 Espoo (FI). **GUSSANDER, Kaj** [FI/FI]; Leppäkuja 1 A, FIN-09400 Espoo (FI).
- (74) Agent: **LEITZINGER OY**; Ruoholahdenkatu 8, FIN-00180 Helsinki (FI).
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(54) Title: SUCTION BAG DEVICE



(57) Abstract: The invention relates to a suction bag device, especially for medical use, which device comprises an airtight container (2) closed with a cover (1), and a suction inlet (4) for producing an underpressure in the container (2) and a suction bag (3) intended for the substance being collected fitted inside the container, which suction bag (3) comprises a first lead-through means (6) to which a tube intended for sucking the substance to be collected is arranged to be fastened in order to convey the substance to be collected into the suction bag (3), and a second lead-through means (7) equipped with a filter (5) for producing an underpressure in the suction bag (3), and which filter (5) has such properties that it allows the flow-through of air but closes when it comes into contact with a fluid. An upwards open clamp (11) is provided on the upper edge of the container (2) for the first lead-through means (6), onto which clamp the first lead-through means (6) is arranged to grip when the suction bag (3) is fitted into the container (2). A sealing means (8) is arranged to surround the first lead-through means (6) on the said clamp (11) in an airtight manner when the cover (1) is closed.

## Suction bag device

The invention relates to a suction bag device, especially for medical use, which  
5 device comprises an airtight container closed with a cover, and a suction inlet for  
producing an underpressure in the container and in a suction bag intended for  
the substance to be collected fitted inside the container, which suction bag  
comprises a first lead-through means to which a tube intended for sucking the  
10 substance to be collected is arranged to be fastened in order to convey the  
substance to be collected into the suction bag, and a second lead-through means  
equipped with a filter for producing an underpressure in the suction bag, which  
filter has such properties that it allows the flow-through of air but closes when it  
comes into contact with a fluid.

15 From the prior art are known suction bag devices of the above-mentioned type  
(e.g. EP 0 861 668 A1), in which the said lead-through means are arranged to be  
first attached to the cover, after which the suction bag attached to the cover is  
fitted into the container and the cover is fastened into place. According to users,  
the use of this type of suction bag device, especially the changing the suction  
20 bag, is cumbersome.

The object of the invention is to provide the type of suction bag device mentioned  
above, in which the suction bag can be changed in as simple a manner as  
possible, ensuring at the same time that the suction bag spreads out correctly  
25 and always settles into the correct position in the container.

This object is achieved in accordance with the invention in such a way and the  
suction bag device relating to the invention is characterised in that an upwards  
open clamp is provided on the upper edge of the container for the first lead-  
30 through means, onto which clamp the first lead-through means is arranged to grip  
when the suction bag is fitted into the container, and that a sealing means is  
arranged to surround the first lead-through means on the said clamp in an airtight  
manner when the cover is closed.

The suction bag will settle automatically into the correct position in the container when the first lead-through means is fitted to the clamp in the container according to the invention. In a preferred embodiment of the invention, the arrangement is such that the outer surface of the first lead-through means is provided with a gripping means, most preferably with a projection, which is arranged to grip onto the clamp provided on the upper edge of the container. This ensures that the suction bag will remain firmly in place already before the container cover is closed.

- 10 The cover is preferably attached to the container by means of a hinge. A further preferable arrangement is that the first lead-through means is arranged to be locked by a locking means between the container and the cover for the duration of use of the suction bag device. In this case, pressing the cover shut ensures definitively, and in as simple a manner as possible, that the suction bag will remain in place also during use, especially when the suction tube inserted into the patient is attached into place in the first lead-through means.

The cover and/or container is preferably provided with at least one air groove which is dimensioned in such a way that the suction bag cannot close the groove.

- 20 The air grooves ensure the access of the underpressure to all parts of the container. On the other hand, the air grooves also make it easier to pull a used suction bag out of the container, because the vacuum produced at the bottom of the container is able to discharge easily when the suction bag is changed.

- 25 The bottom of the container is preferably designed so as to have a curved surface. This means that the suction bag will not be subjected to any great strain in the situation of use, because the bag will spread out evenly. At the same time, the scale on the container will indicate more accurately the real amount of substance sucked into the suction bag.

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Further preferable developments of the invention are described in greater detail with reference to the accompanying drawings, in which:

- Figure 1 shows the suction bag device relating to the invention without the suction bag.
- Figure 2 shows a section along line II-II in Figure 1, with the suction bag fitted in place.
- Figure 3 shows the suction bag device relating to the invention as seen from above.
- Figure 4 shows the upper part of Figure 2 in enlargement.
- Figure 5 shows a section along line V-V in Figure 2 without the suction bag.

The suction bag device shown in the drawings is intended especially for medical use, for example, for sucking different kinds of fluids into a disposable suction bag 3 during surgical operations. The device comprises an airtight container 2 closed with a cover 1, and a suction inlet 4 provided in the cover 1 or container 2 for producing an underpressure in the container 2 and in the suction bag 3 intended for the substance to be collected fitted inside the container.

The suction bag 3 comprises a first lead-through means 6, which is most preferably comprised of a tubular sleeve, to which the tube (not shown) intended for sucking the substance to be collected is arranged to be fastened in order to convey the substance to be collected into the suction bag. The suction bag 3 further comprises a second lead-through means 7 equipped with a filter 5, which lead-through means is also most preferably comprised of a tubular sleeve, for producing an underpressure in the suction bag 3. The filter 5 has such properties that it allows the flow-through of air but closes when it comes into contact with a fluid.

The first lead-through means 6 and the second lead-through means 7 are fitted in the suction bag 3 symmetrically in such a way that the apertures required for them can be made by one procedure, by piercing the opposite walls of the bag

simultaneously. After this, the lead-through means 6, 7 can be fastened to the suction bag 3 in a manner known as such, for example, by using heat and compression.

- 5 In the embodiment shown in the drawings, the cover 1 is attached to the container 2 by means of a hinge 15. At the point opposite to the hinge 15, the cover 1 and the upper edge of the container 2 are shaped in such a way that a tubular opening forms between the cover 1 and the upper edge of the container 2 when the cover 1 is closed. The first lead-through means 6 is arranged to project from  
10 the container 2 through the said tubular opening.

As seen best in Figures 4 and 5, at the outer end of the tubular opening are arranged flange parts 16, 17, between which forms an opening 18 having a smaller diameter, which is dimensioned in such a way that the sleeve-like part of  
15 the first lead-through means 6 can pass through it.

When the cover 1 is open, the lower half of the said tubular opening forms an upwards open clamp 11 for the first lead-through means 6. The first lead-through means 6 grips onto the said clamp 11 when the suction bag 3 is fitted into the  
20 container 3. In the solution shown in Figure 4, the gripping means is an annular projection 9 arranged on the outer surface of the first lead-through means 6, the projection resting on the flange part 16 - especially on its outer surface - provided with an opening 18 and belonging to the clamp 11. In addition to the projection 9, on the outer surface of the first lead-through means 6 is also arranged another  
25 annular projection 19, which rests on the inner surface of the clamp 11 and ensures that the lead-through means 6 settles firmly in place. The first lead-through means 6 is finally locked into place when the cover 1 is closed and locked by means of the locking means 10.

- 30 To ensure the airtightness of the container 2 when the cover 1 is closed, the surfaces coming against each other are provided with sealing. The sealing means 8 fitted in the tubular opening arranged for the first lead-through means 6 is comprised of two semi-circular members, one of which is attached to the con-

tainer 2 side part of the tubular opening, in the space between the flange part 16 and the annular projection 19, and the other on the cover 1 side, in the space between the flange part 17 and the annular projection 19. The sealing means 8 is dimensioned in such a way that when the cover 1 is closed, it compresses slightly and surrounds the first lead-through means 6 in the clamp 11 (tubular opening) in an airtight manner.

In the embodiment shown in Figures 4 and 5, the locking means 10 which locks together the cover 1 and the container 2 is formed by fixed latch parts 20 provided in the part of the container 2 surrounding the first lead-through means 6, and movable latch parts 21 provided in the cover part 1 surrounding the first lead-through means 6. The latch parts 20, 21 engage with each other when the cover 1 is closed. Latch part 21 is arranged at one end of a lever connected to the cover 1 in a suspended manner. The opposite end 22 of the lever forms a release means by pressing which the mutual locking of the latch parts 20, 21 is released, whereby the cover 1 can be opened.

On the inner surface of both the cover 1 and the container 2 are arranged air grooves 12, 13 through which air can exit from between the suction bag 3 and the container 2 or the cover 1, or correspondingly, the air is allowed to enter when the suction bag 3 is to be removed.

The suction bag device functions as follows:

The first lead-through means 6 comprised in the suction bag 3 is fitted to the clamp 11 on the upper edge of the container 2, whereby the suction bag settles in the container 2 at the same time. When the cover 1 is closed, the locking means 10 locks the cover 1 and at the same time the first lead-through means 6 in place, after which the suction tube (not shown) inserted into the patient can be fastened to the free end of the first lead-through means 6 once the plug 23 has been removed.

When an underpressure is conveyed to the container 2 through the suction inlet 4, the suction bag 3 opens and presses at least partly against the inner surface of the container 2 because the filter 5 in the second lead-through means 7 causes some flow resistance. The second lead-through means 7 will then settle automatically to a position with a continuous, non-clogging connection with the suction inlet 4. It is only after this that the underpressure begins to form efficiently also inside the suction bag 3, whereby the fluids being sucked are able to flow into the suction bag 3. The filter 5 in the second lead-through means 7 is a chemical filter known as such, which closes when it moistens and thus acts as an overfill protector and as a cork.

Once the suction bag 3 is full, normal pressure is entered through the suction inlet 4, the said suction tube is detached from the end of the first lead-through means 6 and the end is closed tightly by means of a plug 23. After this, the locking means 10 is released by pressing the ends 22 of the locking means 10 towards each other. The cover 1 can then be opened and the suction bag 3 and its contents can be removed from the container 2.

### Claims

1. A suction bag device, especially for medical use, which device comprises an  
5 airtight container (2) closed with a cover (1), and a suction inlet (4) for producing  
an underpressure in the container (2) and a suction bag (3) intended for the  
substance being collected fitted inside the container, which suction bag (3)  
comprises a first lead-through means (6) to which a tube intended for sucking the  
10 substance to be collected is arranged to be fastened in order to convey the  
substance to be collected into the suction bag (3), and a second lead-through  
means (7) equipped with a filter (5) for producing an underpressure in the suction  
bag (3), which filter (5) has such properties that it allows the flow-through of air  
but closes when it comes into contact with a fluid, **characterised** in that an  
15 upwards open clamp (11) is provided on the upper edge of the container (2) for  
the first lead-through means (6), onto which clamp the first lead-through means  
(6) is arranged to grip when the suction bag (3) is fitted into the container (2), and  
that a sealing means (8) is arranged to surround the first lead-through means (6)  
on the said clamp (11) in an airtight manner when the cover (1) is closed.
- 20 2. A device as claimed in claim 1, **characterised** in that the first lead-through  
means (6) is comprised of a tubular sleeve.
3. A device as claimed in claim 1, **characterised** in that the first and the second  
lead-through means (6, 7) are arranged symmetrically on opposite sides of the  
25 suction bag (3).
4. A device as claimed in claim 1, **characterised** in that the outer surface of the  
first lead-through means (6) is provided with a gripping means (9), most prefera-  
bly with a projection, which is arranged to grip onto the clamp (11) arranged on  
30 the upper edge of the container (2).



5. A device as claimed in claim 1, **characterised** in that the first lead-through means (6) is arranged to be locked between the container (2) and the cover (1) for the duration of use of the suction bag device by a locking means (10).

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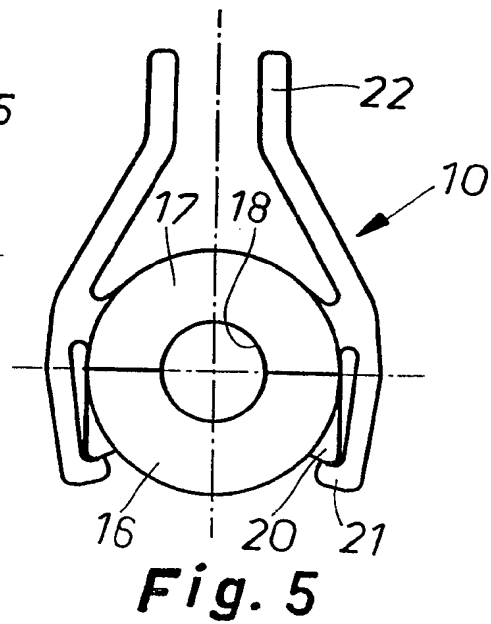
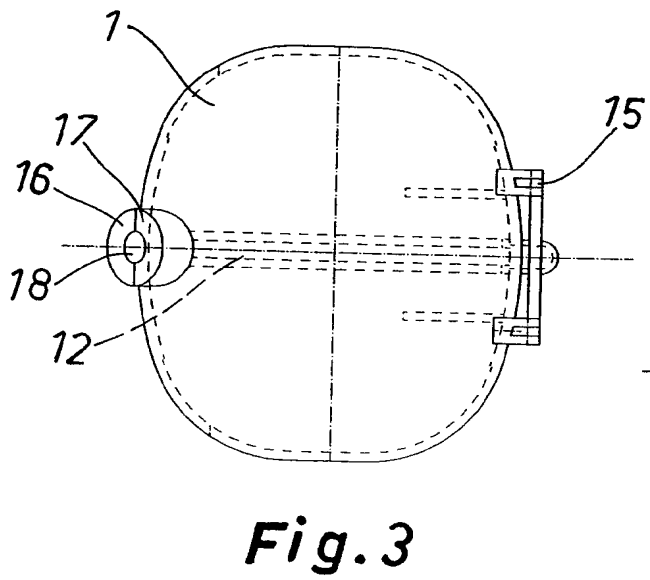
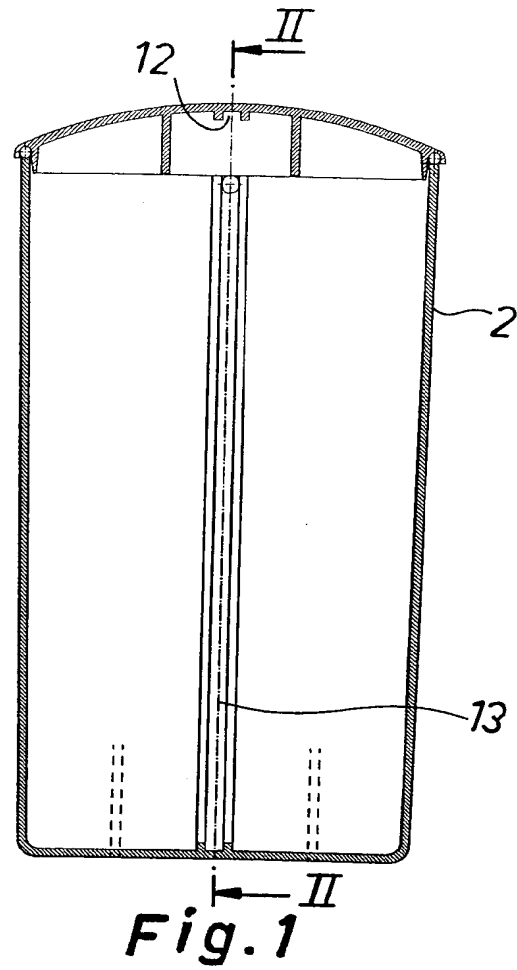
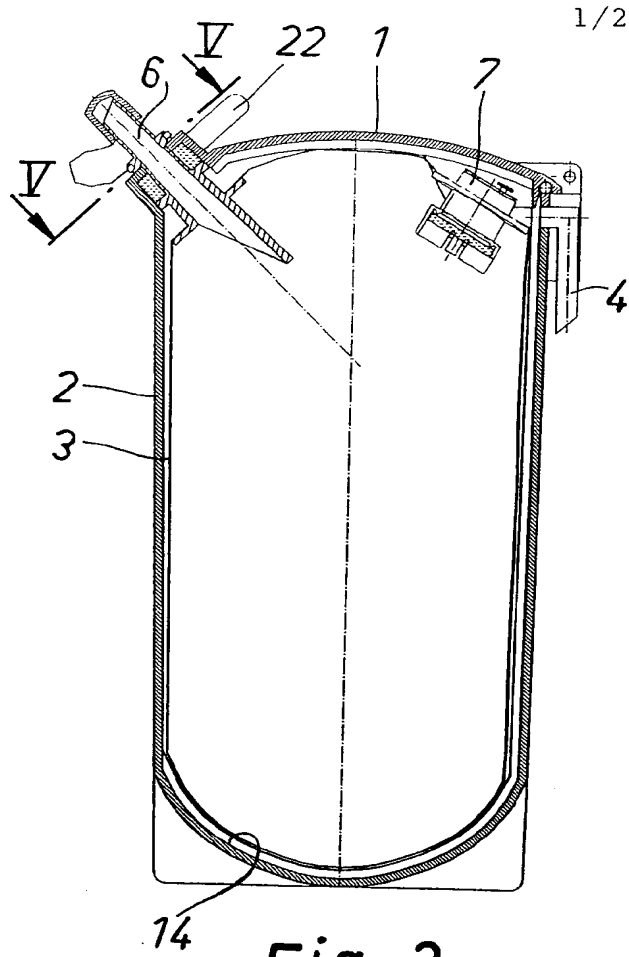
6. A device as claimed in claim 5, **characterised** in that the cover (1) is attached to the container (2) by means of a hinge (15).

7. A device as claimed in claim 1, **characterised** in that the first lead-through means (6) and the second lead-through means (7) are connected to the suction bag (3) in such a way that when the first lead-through means (6) is fixed into place in the clamp (11), the second lead-through means (7) will settle automatically to a position with a continuous connection with the suction inlet (4).

8. A device as claimed in claim 1, **characterised** in that the cover (1) is provided with at least one air groove (12) which is dimensioned in such a way that the suction bag (3) cannot close the groove (12).

9. A device as claimed in claim 1, **characterised** in that the container (2) is provided with at least one air groove (13) which is dimensioned in such a way that the suction bag (3) cannot close the groove (13).

10. A device as claimed in claim 1, **characterised** in that the bottom (14) of the container (2) is designed so as to have a curved surface.



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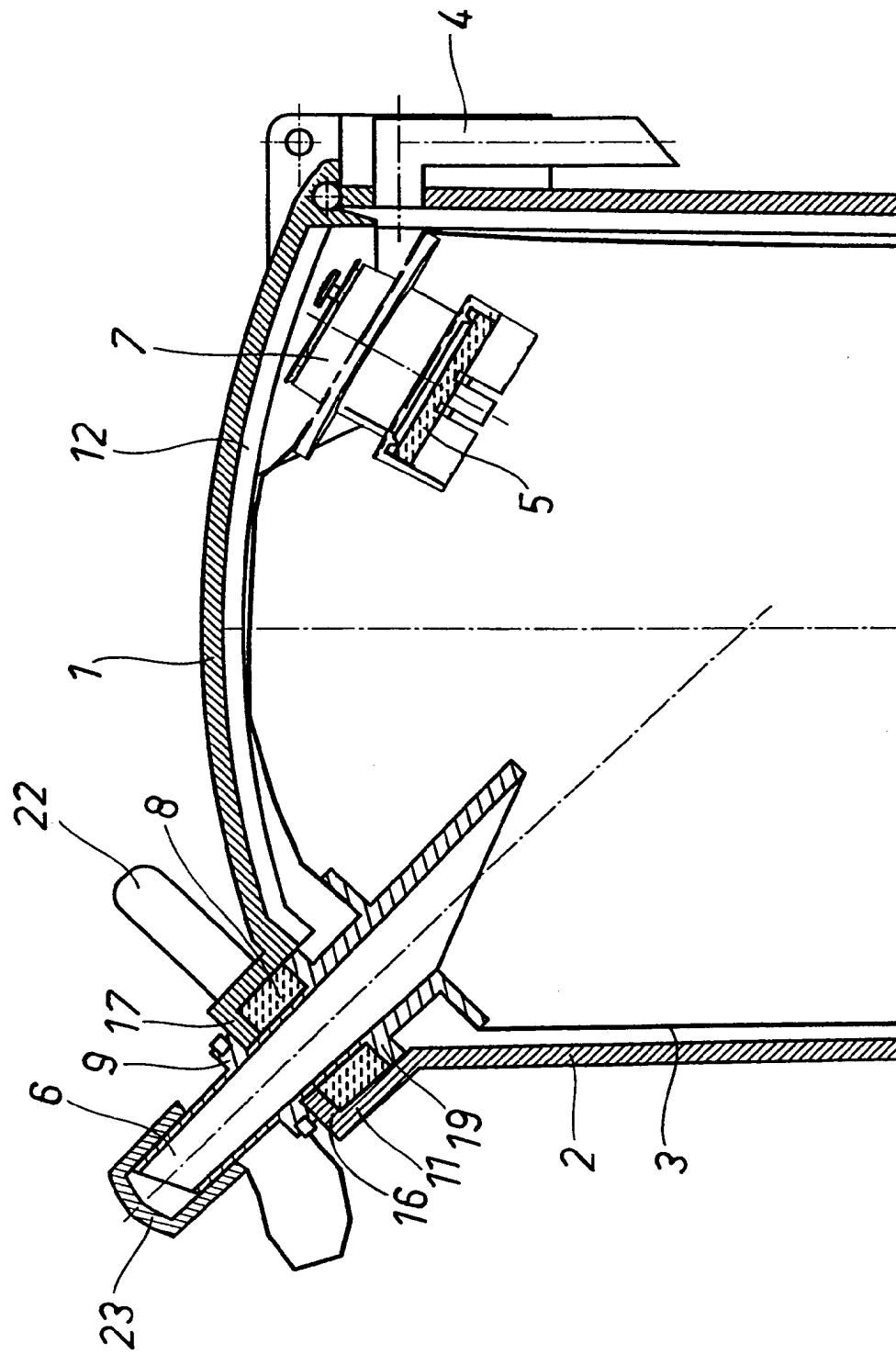


Fig. 4

## INTERNATIONAL SEARCH REPORT

International application No.

PCT/FI 00/01067

## A. CLASSIFICATION OF SUBJECT MATTER

IPC7: A61M 1/00

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC7: A61M

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

SE,DK,FI,NO classes as above

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

WPI, EPODOC

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 3680560 A (KARL A. PANNIER, JR. ET AL), 1 August 1972 (01.08.72), figures 1-7, claims 1-20 --	1-10
A	WO 9524230 A1 (INFUS MEDICAL INTERNATIONAL-VERTRIEB GMBH), 14 Sept 1995 (14.09.95), figures 1-5, claims 1-5 --	1-10
A	WO 9930758 A1 (CENTRO SVILUPPO MATERIALI S.P.A.), 24 June 1999 (24.06.99), figures 1-5, claims 1-12 --	1-10
A	EP 0861668 A1 (MEDELA AG), 2 Sept 1998 (02.09.98), figures 1-3, claims 1-6 -- -----	1-10

☐ Further documents are listed in the continuation of Box C.
 ☒ See patent family annex.

\* Special categories of cited documents:

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"Y" document of particular relevance: the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

Date of the actual completion of the international search

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Name and mailing address of the ISA/  
Swedish Patent Office  
Box 5055, S-102 42 STOCKHOLM  
Facsimile No. +46 8 666 02 86

Authorized officer

Agneta Änggård/EÖ  
Telephone No. +46 8 782 25 00

# INTERNATIONAL SEARCH REPORT

Information on patent family members

02/04/01

International application No.

PCT/FI 00/01067

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